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(71) Applicant

Peter Daniel Lloyd Robin,
Harlech House, Bury Road, Newmarket, Suffolk

(72) Inventor

Peter Daniel Lloyd Robin

(74) Agent and/or Address for Service

William Jones, Willow Lane House, Willow Lane, Norwich,
Norfolk NR2 1EU

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(56) Documents cited

GB 1454882

GB 0693490

GB 0458079

WO A1 83/00474

(58) Field of search

D1R

B8H

Selected US specifications from IPC sub-class B65D

(54) Pallets

(57) A pallet comprises a body formed of compressed straw and so shaped as to provide upper and lower surfaces (13 and 14), Figure 3, with tunnels (12) formed in the body to receive the tines of a forklift. The straw can be contained within a protective wrapping and the tine tunnels (12) may be lined with cardboard inserts. The surfaces (13,14) may be convex. In a modification the straw may be formed into an elongate 'carpet' and then wrapped to form the pallet. In both cases the tunnels are formed after the pallet made.

Compressed straw may also be used to provide packing for central (19) and side cores (18,20), Figure 4, of a conventional pallet having slatted wooden upper and lower decks (15,16).

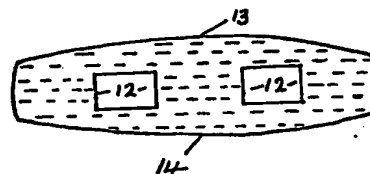


Fig 3

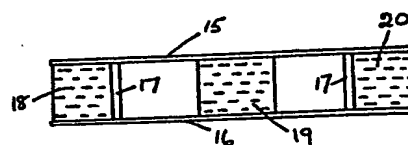


Fig 4

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GB 2 183 597 A

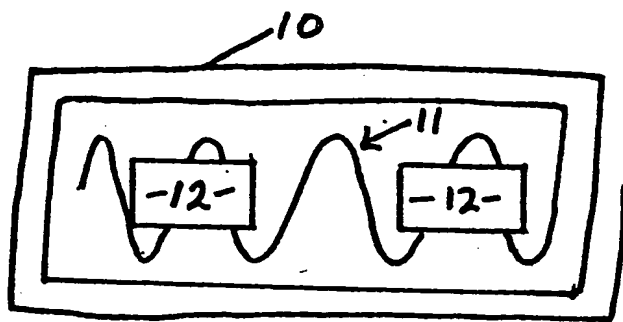


FIG 1

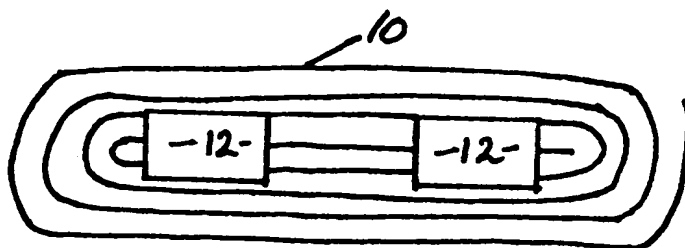


FIG 2

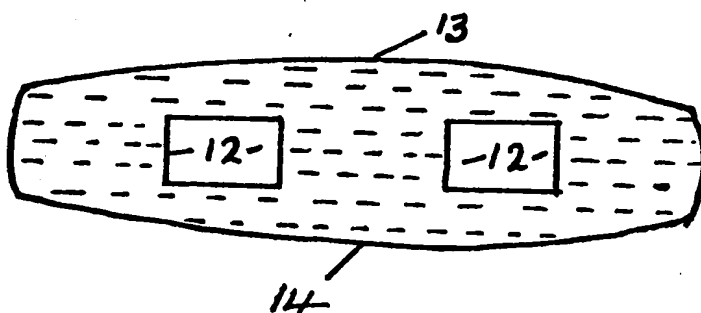


FIG 3

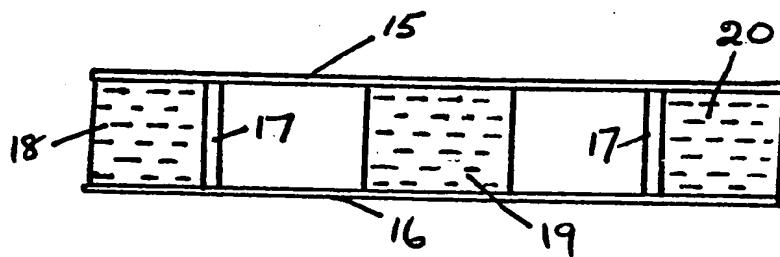


FIG 4

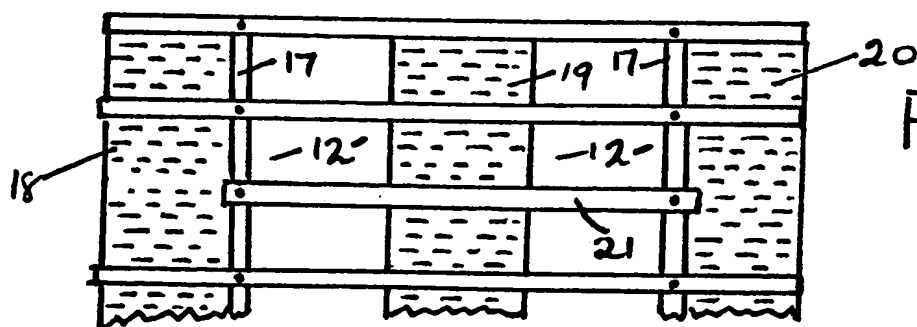


FIG 5

SPECIFICATION

Pallets

5 *Field of the invention*

The invention relates to pallets and is especially (although not necessarily exclusively) applicable to pallets for supporting stacks of pillow packs.

- 10 Pillow packs, as their name implies, are generally rectangular sealed bags, sized and shaped to stack one on another when laid flat, and relatively tightly filled with granular contents which nevertheless usually allow the pack a limited ability to flex.

- Bags of fertiliser, for example, are conventionally sold as pillow packs stacked one on another in the way outlined above; and with the stack supported by a conventional wooden pallet comprising respective top and bottom slatted decks joined to, and spaced from, one another by bearers which define tunnels to receive the tines of a forklift when the stack is to be lifted and lowered.

Review of art known to the applicant

- The conventional pallet, with features as outlined above, is nailed up from wooden strips. The assembly costs are negligible in comparison with the costs of the material (the assembly process is usually fully mechanised). The material has to be of a given specification in any one instance, for reasons of safety and (less importantly) durability. The costs of pallets are a significant factor in the overall cost of bringing bulk materials to the market in pack form.

- These costs are especially significant in the handling and storage of pillow packs containing fertiliser. These currently may be sold in 50 Kg bags. A 50 Kg bag of fertiliser is physically far bigger than, for example, a 50 Kg bag of cement. Pallets for supporting a stack of fertiliser packs must therefore be quite large and, especially when several stacks are themselves stacked one on top of another, the pallets must resist the inevitable tendency to buckle and/or slip cornerways.

- Because of the substantial costs of the conventional pallet in the overall pack-moving and marketing operation, most pallets in current use are put out as theoretically returnable. The drawbacks of this attempted scheme are well known and need not be enlarged upon here.

- There is therefore a clear need, especially in the field of pillow-pack storage and transport of such materials such as fertilisers, for a pallet which, whilst cheaper than the conventional wooden pallet, would nevertheless be just as versatile, well able to stand the stresses to which it is subjected in use, and (possibly above all) able, at the last, to be discarded and readily disposed of rather than having to be returned as conventional pallets theoretically are.

Summary of the invention

- 60 According to one aspect of the invention there is provided a pallet which is formed wholly or principally of compressed straw.

- More specifically, according to this aspect of the invention, a pallet comprises a body formed of compressed straw and so shaped as to provide upper

and lower decks, with tunnels formed in the body of compressed straw to receive the tines of a forklift when the pallet is to be lifted or lowered.

- The body of compressed straw may be contained within a protective, waterproof wrapping. For example, the top and bottom decks and/or the out-board walls of an otherwise wholly-straw-compressed pallet may be defined by waterproof board. The tine tunnels may also be lined with card-board inserts.

- 75 The body of compressed straw may be honeycombed or otherwise apertured to reduce the overall weight of the pallet.

- The space between the top and bottom decks of a conventional pallet (including the space outboard of the bearers) is conventionally empty. The conventional pallet relies on the inherent strength and constructional spacing of its wooden strip components to resist the loads imposed on it in use. Another aspect of the invention is based on the realisation that this space constitutes potentially a core of the pallet which, if filled with appropriate material, could reinforce the pallet so that the decks and bearers of the pallet could then be downrated.

- 90 An ideal material for the reinforcing is straw, which is plentifully available, frequently produced in such quantities that it is wasted or used for the most utilitarian purposes in order simply to give it any use at all, and is especially suited to use on pallets which may well not be returned and which may have to be burned in order to dispose of them.

In accordance with this other aspect, therefore, the invention is embodied in a straw-cored pallet.

- The core of the pallet may be wholly or partially filled with straw. In the latter case, the central core (i.e. the space bounded by the top and bottom decks and the respective and mutually facing inboard surfaces of the bearers) may be filled, with the side core portions (the spaces out-board of the bearers) unfilled. At first analysis, this has advantages over the converse arrangement, as the region of the top deck which spans the central core supports most of the downthrust from the stack.

- Conversely, however, if the central core remains unfilled - or is filled with a less dense mass of straw than the side core portions - whilst the side core portions are filled, there could be advantages; because such an arrangement would more firmly resist the tendency to buckle and flex cornerways which is inherent, as outlined above, in a stack-on-stack arrangement.

- In any arrangement embodying the invention, the pallets when viewed in end elevation may have a noticeably convex top deck and/or bottom deck; which, when loaded, compresses appropriately as it takes the thrust of the stack.

- It is currently envisaged that in most practical embodiments of the invention, the straw core will be compressed and will be relatively tightly bound peripherally. It may for example be shrink-wrapped or stretch-wrapped (the latter particularly advantageous in giving strong edge-protection and hence resistance to cornerways buckling in multi-stacks) and/or it may be sewn, strapped or sprayed with a binding agent such as a suitable resin.

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Where the pallet has defined top deck, bottom deck, and bearer components, these may be covered by the wrapping or alternatively individual core components may be manufactured and wrapped (or otherwise held together) for insertion into pallets having the conventional empty space between their top deck, bottom deck and bearer components.

Brief description of the drawings

The accompanying drawings show, by way of example only, a succession of pallets embodying the invention. *Figures 1 to 4* inclusive show respective pallets in end elevation. *Figure 5* shows part of the pallet of *Figure 4* in plan.

Description of the preferred embodiments

In *Figure 1*, straw 10 which has been initially flattened and baled into an elongate "carpet" is first concertinaed (as at 11) and then wrapped round on itself as shown. Square-section tunnels 12 to take the tines of a forklift are cut through the elongate block-like pallet so formed. Means of cutting the tunnels through material such as compressed straw can readily be selected without inventive thought. The tunnels 12 may be lined with cardboard inserts (not shown).

In *Figure 2*, similarly baled and initially carpet-form straw 10 is wrapped round on itself to define another block-like elongate pallet which has tine tunnels 12 cut through it.

In *Figure 3* the top deck 13 and the bottom deck 14 of the pallet are each noticeably convex so that, when the pallet is loaded, both decks compress, and the loaded pallet approaches the form of the pallets of *Figures 1 and 2* under the thrust of the stack. The pallet is formed from compressed straw as by being extruded under pressure, and tunnels 12 are then cut through it.

In *Figure 4*, a pallet of otherwise conventional construction (i.e. having slatted wooden top and bottom decks 15 and 16 joined to, and spaced from, one another by bearers 17) has its central core and its side core portions packed with straw cores 18, 19 and 20 formed by any of the methods described above with reference to *Figures 1 to 3*. The central core 19 is spaced from the bearers 17 to define tunnels 12 to receive the tines of a forklift.

As *Figure 5* shows, every third slat 21 in the top and bottom deck of this particular pallet runs only as far as the bearers 17, without overhanging the bearers 17. The individual wooden slat and strip components of this pallet are downrated in comparison with those of the conventional non-reinforced pallet. By comparison with a conventional pallet, one set of bearers has also been removed.

In the pallet of *Figures 4 and 5*, the side cores 18 and 20 could be lashed to the bearers 17; and the central core 19 could be lashed to the slats of the top and bottom decks.

The term "straw" in this specification is intended to be indicative rather than unduly definitive. In other words, any suitable stemmed crop could serve to embody the invention.

Methods of compressing straw, albeit for the different purposes of forming fuel briquettes, and of

treating it during compression, are described and illustrated in published UK Patent Specifications Nos. 578 336, 2 071 560 and 1 124 544.

In any arrangement embodying the invention, the straw stems are preferably so orientated that in use, the majority of them lie substantially across rather than along the pallet (i.e. they lie, in a pallet having a slatted deck, parallel to the slats and at right angles to the axes of the tunnels 12).

The pallets shown in *Figures 1 to 3* can be peripherally bound, as by shrink-wrapping or stretch-wrapping, or they may have a waterproof protective wrapping sewn or strapped to them. They can alternatively be sprayed with a binding agent such as a suitable resin.

The cores 18, 19 and 20 of the embodiment shown in *Figures 4 and 5* can also be individually wrapped or otherwise protected.

CLAIMS

1. A pallet which is formed wholly or principally of compressed straw.

2. A pallet according to claim 1, wherein the compressed straw is in the form of a body so shaped as to provide upper and lower decks, with tunnels formed in the body of compressed straw to receive the tines of a forklift when the pallet is to be lifted or lowered.

3. A pallet according to either of the preceding claims, wherein the compressed straw is contained within a protective waterproof wrapping.

4. A pallet according to claim 2, wherein the tunnels are lined with inserts.

5. A straw-cored pallet.

6. A pallet according to claim 5 and comprising upper and lower decks connected by bearers, wherein the space between the bearers contains a core of compressed straw and wherein the spaces outboard of the bearers each contain a core of compressed straw.

7. A pallet according to claim 2 or claim 6, wherein the top and/or bottom decks are of convex form in end elevation.

8. A pallet according to claim 5 or claim 6, wherein the or each core is contained within a protective waterproof wrapping.

9. A pallet substantially as hereinbefore described with reference to and as shown in *Figure 1*, or *Figure 2*, or *Figure 3* of the accompanying drawings.

10. A pallet substantially as hereinbefore described with reference to and as shown in *Figures 4 and 5* of the accompanying drawings.

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